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REPORT ON UNIDO/OTAI CO-OPERATION PROGRAMME FOR  
VEGETABLE OIL TECHNICIANS AND TECHNOLOGISTS  
FROM DEVELOPING COUNTRIES <sup>1/</sup>

organized by  
United Nations Industrial Development Organization (UNIDO)  
in co-operation with the  
Oil Technologists Association of India (OTAI)\*

held in India  
from 24 January to 9 February 1976

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\* A report prepared by the Oil Technologists Association of India (OTAI) and cleared in substance by UNIDO.

<sup>1/</sup> This report has been reproduced without formal editing.

Under the United Nations Industrial Development Organization (UNIDO) and the Oil Technologists' Association of India (OTAI) Co-operation Programme, fourteen delegates having high qualifications and valuable experience and holding important positions in their respective countries have visited representative vegetable oilseed and oil-processing industries, research organizations, universities and quality control institutions located at different centres throughout India during the period from 24 January 1976 to 9 February 1976. They have also met and discussed with representatives of the Trade and officials of the Indian Government various problems of the Vegetable Oil Industry. They have studied the progress made in India and explored the possibilities for co-operation between India and the developing countries. Mr. C. B. Khanpara, Chairman, and Mr. G. Lakshminarayana, Member of the International Administrative Council of the OTAI have accompanied the delegates. The names and addresses of the delegates are given in Annex I and an outline of the tour programme is given in Annex II.

At Bombay, the delegates divided themselves into groups, since a large number of industries are situated at long distances, and went round the industries and institutions of their choice. They observed the manufacture of soaps, fatty acids, glycerol, cosmetics, refined oil, hydrogenated fats (vanaspati), oilseed proteins, cattle feed and oilseed crushing and solvent extraction. They also visited manufacturers of solvent extraction plants, refining units, cattle feed units, auto-claves, centrifuges and auxiliary equipment etc. One group went by rail to Akola and Khamagao in Maharashtra to study the processing of cottonseed and cottonseed oil. They visited Hindustan Lever Research Centre and also Bombay University Department of Chemical Technology where under-graduate and post-graduate students are trained in Oil Technology, Food Technology and Chemical Engineering and research in oils, fats and surfactants is being carried out.

At Hyderabad, the delegates visited castor seed, groundnut and rice bran processing plants as well as the plants manufacturing soap, refined oil and vanaspati. They went round with interest an expeller manufacturing workshop. They showed much interest in the pioneering research and development efforts of the Regional Research Laboratory, a national laboratory engaged partly in utilization of indigenous oilseeds, particularly of regional importance, viz. castor, cottonseed and sal. The members also visited pilot plants on processing of oils and oilseeds. This was followed by a conference.

At Bangalore, the delegates were taken round the Government Soap Factory engaged in the manufacture of washing soap, toilet soap and synthetic detergents.

At Mysore, the delegates visited Government Sandalwood Oil Factory and the Central Food Technological Research Institute, a National Laboratory, where pioneering work on groundnut protein concentrate and isolates has been done. The delegates also discussed with various scientists engaged in research on engineering design, food, pest control, packaging, etc.

At Calcutta, the delegates observed the manufacture of vanaspati, soaps and cosmetics, detergents and solvent extraction of oilcakes. They visited the National Test House where work of importance in testing various materials is being done. They also visited a fabrication and engineering unit engaged in the manufacture of pressure vessels and equipments suitable for oil processing industry. Conferences were held with members of OTAI, industrialists, East India Millers' Association and machinery manufacturers for exchange of views.

At Kanpur, the delegates visited mustard seed crushing units (first in Kohloes-power driven rotaries and then in expellers), expeller manufacturing units and an oil hydrogenation factory. Conferences were held with U.P. Oil Millers' Association for discussion on processing, procurement of materials and latest technology with various members. The delegates also visited H. B. Technological Institute where they observed pilot plants in working condition on various oilseeds. A conference was arranged at H.B.T.I. where OTAI members, industrialists and UNIDO delegates exchanged their views.

At Agra, the delegates saw again crushing of mustard seed, hydraulic pressing of castor oil, manufacture of dehydrated castor oil, blown oil and stand oil. They also visited a wheat flour mill.

At Delhi, the delegates visited a large vanaspati manufacturing unit and also saw the production of margarine and soap. They also visited an expeller manufacturing plant. They had the opportunity of visiting the Indian standards Institution and understanding its method of working in formation of standards. They visited Indian Agricultural Research Institute at Pusa, where oilseed breeding and research is an important programme, and a private industrial research instituts where work on oils and fats and surface coatings and polymers receives important consideration. They had also the opportunity of participating in the 31st Annual Convention of the Oil Technologists' Association of India and in the technical sessions on various topics of current importance and discussing with the OTAI delegates. They also met Government officials of the Indian Council of Agricultural Research to discuss problems of oilseeds production and processing.

At the above places there were informal conferences and informal get-togethers with industrialists, traders, businessmen, technologists, researchers and government officials. On every occasion, the UNIDO Representative explained the objectives of this tour under UNIDO/OTAI Co-operation Programme. The main objsootive was to get first hand knowledge of the current situation, and the progress made in regard to the following:

- Oilseed raw material production, crushing and extraction;
- Manufacture of expellers, solvent extraction plants and oil processing plants including refining and hydrogenation;
- Soap and detergent manufacture;
- Capabilities of India to help the developing countries by way of collaboration and export of equipment and know-how and exchange of experts.

The Programme's objective in the first instance was to establish personal relations and obtain a first-hand knowledge about the Indian vegetable oil industry. Apart from this main objective, the delegates were given an opportunity to learn more about the people of India and their cultural, historical and scientific backgrounds. The delegates

in return were expected to outline and explain the progress made by their respective countries and give their impressions and observations of Indian achievements, capabilities and drawbacks.

The Turkish delegate said that cottonseed and sunflower are the major oilseed crops and groundnut and olive minor ones. Turkey grows American variety of cottonseed with high percentage of lint. It gives ten per cent to eleven per cent lint total, three per cent being first cut and five per cent to eight per cent on second cut. Delinted and decorticated seeds are fed with some hulls for better working. They use a 12-high cooker for thirty five tons/day expeller. French expellers of sixty tons capacity are also used to reduce oil content to three per cent. Turkey does not manufacture machinery and it imports the same from Europe and the USA. He is pleasantly surprised that India has developed nice oil mills machinery working efficiently and that India is in a position to export machinery. He, however, regretted that India is not crushing all the available cottonseeds which would give about three lakh tons of oils per year.

The Egyptian delegate said that oilseed industry is a major one in his country. The economics of oil industry is different in Egypt; the prices of both raw materials and products have been more or less kept constant due to Government regulations. Ninety-nine per cent of the oil industry belongs to the Government. Egypt is short of vegetable oil and is importing cottonseed, sunflower, rapeseed and soybean oils. 100,000 tons of hydrogenated oil (pastry margarine) is made per annum. 40,000 tons of detergents is manufactured. Cattle and poultry feed manufacture has also come up (1.3 million tons/annum). No deoiled meal is used by humans. He felt that more oil mills in India should install cattle-feed factories. In his country corn cobs are incorporated into cattle feed. Molasses content in cattle feed could be brought down from ten per cent to three per cent. If pelletization is employed more of deoiled meals could find outlet in cattle feed formulations. Eighty to one hundred thousand tons of rice bran and ten to twenty thousand tons of rice germ are produced. Smaller size pellets than normally employed in India are used for rice bran extraction. He suggested that rice bran should not be mixed with husk as it is not good for solvent extraction or animal feed. He also

suggested the remodelling of rice mills to avoid much husk in the bran and to get maximum rice bran oil without deterioration by installing stabilizers in such modern mills. Solvent extraction plants are from Belgium. Deoiled meal is used for cattle feed. Oil is used for soap. Cottonseed is the major crop; linseed and sesame are the minor ones. Much of the oilseed is expressed in hydraulic presses. Both laundry (18,000 tons) and toilets (25,000 tons), soaps, detergents (40,000 tons) and glycerine are manufactured. Refining, deodorization and saponification are continuous processes. He commended that India has enormous resources of oilseeds, both edible and non-edible, and that import of tallow is neglected. Sal fat is a new find in India. The prices are attractive for Egypt to have sal fat. The seeds are grown in Egypt both for oil and fibre. India can work in this direction. The Egyptian delegate is impressed with the progress made by India in the manufacture of expellers, solvent extraction plants and other auxiliary machinery. Though they have an Arab Oil and Soap Technologists' Association, he is impressed with the OTAI activities and he suggested formation of such associations in all the developing countries and a federation of all such associations from Asia and Africa.

The Indonesian delegate mentioned that coconut oil is the major oil and is obtained from one million tons of copra by expelling only. The oil content in copra is sixty-five per cent. Only coconut oil is exported but not copra. Only two solvent extraction plants are installed. There is good scope for India for setting up solvent extraction plants for extracting 300,000 tons of copra cake. Three hundred tons of groundnut (for edible use), 300 tons of soybean (for proteins) and 100,000 tons of palm oil are also produced. Indonesia produces twelve million tons of rice per year which yields 0.8 to one million tons of rice bran. The problem of collection from widely scattered 2000 islands is an acute one and therefore, rice bran is not being extracted. Rice bran oil, under the present circumstances will not be able to compete with coconut oil which is available only at Rs.3,-/kg. He is impressed with India's self-sufficiency in machinery and its performance in exports, processing of variety of minor oilseeds, research and development efforts in research laboratories and the OTAI activities. He said Indonesia could learn from



India by sending its personnel. Indonesia is interested in medium capacity of expeller, extraction plant and refineries, each with capacities of ten to twenty tons per day, and labour intensive machinery, as the supply of material is not continuous. Highly sophisticated machinery is not desired at the present. Indonesia is also interested in spare parts if the delivery time is not too long. There is a good scope for Indonesian technologists to learn from India about processing technology and machinery manufacture. He suggested Indian entrepreneurs for a joint venture and also asked to offer machinery.

The Malaysian delegate informed that Malaysia produces one million tons of palm oil and only ten per cent of it is consumed and the rest exported. By 1980 Malaysia expects to produce 1.5 million tons of palm oil and 0.5 million tons of palm kernel oil. Malaysia expects to refine 0.5 million tons of palm oil next year. It is obtained by expelling of the fruit. He also expressed an interest in a process know-how for the separation of valuable carotenes from palm oil. He mentioned that Malaysia's Research and Development Organisation (Crop Production Division, Oil Palm Sub-Division) could help India regarding palm plantations. The pest problem has been overcome with an improved variety. India in turn could help Malaysia with research and development efforts in isolation of carotenes from palm oil and fractionation of palm oil. Indian entrepreneurs are invited to Malaysia for a joint venture on palm oil processing. He inquired what sort of guarantees Indian manufacturers can give for their machinery.

The Thailand delegate mentioned that disposal of black soybean meal used to be a problem, but it is no longer so as it is now sold to feed manufacturers. Protein content is kept minimum at 44 per cent. Thailand produce thirty million tons of rice per year, but a lot of the bran goes to farmers and does not reach industry. FFA of rice bran oil is twenty to twenty-five per cent which is processed by miscella refining method to get oil of FFA less than 0.08 per cent. Eighty-five per cent of edible oil is imported. Rice bran oil is refined in miscella with ethanol or isopropanol. If the free fatty acid content is more than six per cent, miscella refining is preferred. Dewaxing of rice bran oil is done by winterization of miscella. The crude fatty acids obtained from soapstock

are distilled, reesterified with glycerol and sold. Spent earth is extracted for oil in hermetically sealed extractors. He mentioned that Kenaf is grown on large scale for fibre, but seed is not used for oil. He is impressed with the activities of the ISI.

The Kenyan delegate informed that there is lot of potential for oilseeds in Kenya. At present seventy per cent of imported oil is consumed in the country. Rice growing industry is slowly coming up. Palm oil is used in Kenya for shortening, margarine, etc. He was impressed with India's progress in processing of oils and oilseeds and manufacture of machinery and equipments.

The Syrian delegate is impressed with India's achievements in vegetable oil industry, particularly with its utilization of indigenously produced oilseeds of tree origin. He showed much interest in technologies for manufacture of protein, castor products and machineries and equipments available in India. He felt that there is much that could be done on co-operative basis for the mutual benefit of the developing countries.

The Philippines delegate mentioned that coconut is the main product in the Philippines. Coconut oil is used in place of butter. They make three varieties of coconut milk. Colour, antioxidants and salt are allowed in the manufacture of margarine. They want to modernize coconut industry as an integrated one to manufacture coconut oil, protein, flour, along with utilization of coir and shell in manufacture of varieties of items. India can contribute a lot by active participation. They are much impressed with the activities of Indian Standards Institution and Quality Control Laboratories of some industries as well as research and development efforts in laboratories.

The Yugoslavian delegate informed that his country imports (fourty per cent of requirement) soybean and rapeseed oils, coconut oil and palm oil. Four hundred thousand tons of sunflowerseed are produced from indigenous varieties yielding 24 - 48 % oil. 39 - 40% oil content in Indian

varieties of sunflower seems to be low. There is no problem of dehulling if seeds are dried to six per cent moisture. Sunflower seeds are first expelled to leave twenty per cent oil in the cake, which is then extracted. Meal containing half of the hull (thirty-five per cent protein) is used for cattle feed. Yugoslavia is not interested in sunflower meal for human usage. Winterization of sunflower seed oil is a problem to be tackled. According to him, not only wax but also the phosphatides cause turbidity. Winterization is now done after setting at low temperature for 2-3 weeks. It is used as a salad oil and is too good to be hardened. Yugoslavia is planning to increase the production of sunflower seeds to 800,000 tons. Yugoslavia has gathered considerable experience on sunflower cultivation, selection of area, climate, polynation, etc. and India can benefit from this experience.

The Ethiopian delegate mentioned that niger and linseed oils are consumed as edible oils. Ethiopia grows rapeseed, linseed, sunflower and sesame seeds. Ethiopia is short of oil mills and solvent extraction plants to utilize the oil wealth and there is good scope for Indian entrepreneurs to these oil-based industries in Ethiopia.

The Singapore delegate informed that 2,000 tons of vegetable ghee is made from palm oil. Palm oil, coconut oil and groundnut oil are imported from neighbouring countries. He mentioned a process for fractionation of palm oil into a solid fraction (m.p. 42-44°) and a liquid fraction (m.p. 20-22°C). The solid fraction can be used as vegetable ghee. The liquid palm oil fraction can be blended with other liquid oils like coconut oil or groundnut oil or blended with seven per cent of hydrogenated palm oil (m.p. 53°) to give vegetable ghee. The processed palm oil is mostly exported. He expressed an interest in Indian machinery and plants.

The Venezuelan delegate mentioned that his country produces cottonseed, groundnut, sesame and maize oils. His country is interested in palm oil fractionation and rice bran oil extraction. He felt that the design of Indian expellers should be improved, by including hydraulic controls and that the capacity should be raised to two hundred tons per day to suit first pressing with twenty per cent oil content in seeds to suit

the need of developed countries. He was impressed with the expellers available in India. He stressed the need for India to study the requirements of spares for this industry to be supplied from India. He also thought deodorization of vegetable oils should be done in continuous plants to get better quality oil and to save on steam consumption. He also mentioned that Venezuela farmer developed a simple harvesting machine for sesame seed which India may find interesting. He is not impressed with the soap quality in India. This may be due to vagaries in raw materials for soap manufacture since these should be used soon without long storage to prevent off colour development. He is impressed with conscientiousness of the Indian workers and technologists and particularly with the work done at R.R.L., C.F.T.R.I. and U.D.C.T.

The ESCAP/UNIDO delegate mentioned that economies of vegetable oil production and marketing vary from country to country. For example, rice bran oil cannot compete with indigenous oils (Coconut and Palm) in Indonesia and Malaysia.

The UNIDO representative made several observations in the course of various discussions, some of which are given below:

- i) Steel-line bars could be used in expellers which will last three to four times longer than the present ones;
- ii) Higher capacity pre-presses are needed to go with solvent extraction units. Two hundred tons-capacity pre-presses are being offered by other countries;
- iii) There is a need for developing small stabilizers for rice bran which can be attached to small rice mills in villages and which can be operated without steam or electric powers;
- iv) The problems of pelletization of stabilized rice bran or par-boiled rice bran become increasingly important and relevant. Applied research is strongly recommended in this particular field;
- v) India should solvent-extract more oilcakes. A good proportion of oilcakes from castor, mustard, sesame, safflower and other oil seeds remain unextracted resulting in considerable losses of oil for human consumption;

- vi) Marketing problems of extracted meal including the detoxification of castor meal should be solved. Research and development efforts and educational programmes should be pursued;
- vii) The UNIDO-Yugoslavia Centre could help India with regard to sunflower seed setting and processing.

The UNIDO representative on his behalf and on behalf of other UNIDO delegates, has generally summarized the impressions of the tour as below:

- 1) The delegation is impressed with the progress made in augmentation of oil resources and tapping of new sources. However, much more needs to be done;
- 2) The delegation is impressed with the remarkable progress made by India in becoming self-sufficient in manufacture of solvent extraction plants and auxiliary equipment and in undertaking turn-key jobs connected with many aspects of vegetable oil industry. It is also impressed with India's export capabilities;
- 3) It is impressed with the tapping of India's indigenous tree oil wealth and the processing technologies developed for the same. Other countries can utilize India's experience in tapping similar resources;
- 4) India is also forging ahead with the development of sophisticated technologies for the manufacture of various products from indigenous oils like castor oil and sal fat;
- 5) India's contribution to the development of vegetable ghee from edible oils and vegetable tallow from non-edible oils is noteworthy;
- 6) India is the first country to industrially produce edible grade oilseed proteins, particularly from groundnuts;
- 7) Research and development efforts in national, industrial and university laboratories are noteworthy. The quality of human resources in this regard are good. Though there appears to be duplication in research and development efforts when viewed broadly, it is not so in view of the vastness of the country and the variety of tailor-made products that can be developed;

- 8) The Indian Standards Institution has done commendable work;
- 9) OTAI is one of the most active organisations with all-India support from industries, Government, scientists and technologists and has excellent organizing capacity.

India can help the developing countries in the following ways:

- 1) Vegetable ghee production;
- 2) Oilseed proteins flour production;
- 3) Research and development on indigenous oilseed of developing countries (palm oil, kenaf, etc.);
- 4) Export and installation of machinery and plants, particularly expellers and solvent extraction plants;
- 5) India can help formation of Associations similar to the OTAI in developing countries and form a federation for active and continuous co-operation;
- 6) Exchange of information and experts.

India can receive help from developing countries in the following ways:

- 1) Though India has done valuable work in rice bran oil extraction, it can benefit from experiences of Thailand and Egypt;
- 2) Similarly, Yugoslavia, through the UNIDO-Yugoslavia Centre, can help in sunflower seed production and processing;
- 3) Malaysia can help in palm oil production activities;
- 4) Singapore can help in palm oil processing and utilization.

UNIDO can help the developing countries to help themselves in the following ways:

UNIDO is in a position to assist developing countries in their efforts to further develop their vegetable oil industry and to increase its industrial production efficiency. Short-term expert services can be made available and even trouble shooting exercises can be carried out by UNIDO under the SIS financing scheme. Larger development projects covering the entire field of industrial vegetable oil production and processing operations are to be incorporated in the UNDP country programme for implementation by UNIDO. The UNIDO representative offered his services to the delegates and encouraged direct correspondence on problems they may be faced with.

On his own behalf and on behalf of the UNIDO delegates, the UNIDO representative thanked Professor J. G. Kane and Dr. D. R. Dhingra, the past Presidents of OTAI, Professor M. M. Chakrabarty, the present President of OTAI, the Executive Council of OTAI, the Presidents and the Executive Committees of the five Zones of OTAI, the International Administrative Council of OTAI for the excellent co-operation offered by them and Mr. C. B. Khanpara, the Chairman of the International Administrative Council for organizing the programme in the most efficient manner. He also thanked Mr. G. Lakshminarayana and Mr. C. B. Khanpara for accompanying the UNIDO delegates throughout their tour in the country and helped them in every possible way, the personnel in charge of the various industries, Institutes, Organisations, Associations and Research Laboratories who took them round and discussed freely and extended a warm hospitality.

The UNIDO representative also thanked the UNIDO delegates for their co-operation and for making best use of the tour, and the Government of India for enabling the Co-operation Programme to materialize.

Mr. Khanpara and Mr. Lakshminarayana thanked the UNIDO representative and other UNIDO delegates for their co-operation, consideration, patience and friendliness shown throughout the tour and hoped that this will be the first milestone in the mutually beneficial UNIDO/OTAI Co-operation Programme.

ANNEX I

PARTICIPANTS ATTENDING THE CO-OPERATION PROGRAMME FOR VEGETABLE OIL INDUSTRIES AND TECHNOLOGISTS FROM DEVELOPING COUNTRIES:

India; 24th Jan. to 9th Feb. 1976

No.	Name	Country	Address
<u>Participants from Developing countries:</u>			
1.	Mr. Bekir Aksogan	Turkey	Qukobirlik Merkez Yag Tesisleri P.K. 550, Adana, Turkey.
2.	Mr. K. E. Beyali	Egypt	Alexandria Oil and Soap Co., P.O.Box 402, Alexandria, Egypt.  <u>Cairo Office:</u> 11, Eltahrir Quare.
3.	Mr. A. Gaffar	Indonesia	C/o Pinda Minyak Nabati Jalan P. Lumumba 165, Surabaya, Indonesia.
4.	Mr. A. B. Husin	Malaysia	Malaysian Agricultural Research Development Inst. (MARDI), Agricultural Product Utilization Division (APU), P.O.Box Upm 202, Serdang Selangor, Malaysia.
5.	Mr. B. Krishnakan	Thailand	Industrial Enterprises Co.Ltd., 39/6 Mu 3 Tivanon Road, Benmai, Pak-kred, Nonburi, Thailand.
6.	Mr. E. Kinyanjui	Kenya	East Africa Industries Ltd., P.O. Box 30062, Nairobi, Kenya.
7.	Mr. K. Khangy	Syria	Khan El Harir, Damascus, Syria.
8.	Mrs. A. T. Lorenzo	Philippines	C/o Food and Drug Administration, Dept. of Health, Sfa. Cruz, Manila, Philippines.
9.	Mrs. J. Lucero	Philippines	C/o Food and Drug Administration, Dept. of Health, Manila, Philippines.
10.	Mr. S. Matic	Yugoslavia	Tvornica Ulja, Braninirova 71, 41000 Zagreb, Yugoslavia.
11.	Mr. S. Metaferia	Ethiopia	P.O. Box 30155, Addis Ababa, Ethiopia.



No.	Name	Country	Address
12.	Mr. C. Selva	Singapore	21-A, Jalan Kechubong, Singapore 28.
13.	Mr. M. Schneider	Venezuela	Apartado 62386, Caracas, Venezuela.
14.	Mr. Wong Meow Fong	Singapore	Edible Products Ltd., 255, Jalan Boon Lay, Singapore (22).

Representatives of Oil Technologists' Association of India:

1. Mr. C. B. Khanpara  
391 B, Barsana,  
Telang Cross Road No.3,  
Kings Circle, Bombay-400 019,  
India.
2. Mr. G. Lakshminarayana  
Oils & Fats Division,  
Regional Research Laboratory,  
(CSIR),  
Hyderabad-500 009,  
India.

Representatives of UNIDO:

1. Mr. H. Koenig  
United Nations Industrial  
Development Organisation,  
P.O.Box 707,  
A-1011 Vienna,  
Austria.
2. Mr. H. G. R. Reddy  
UNIDO Regional Industrial Adviser,  
(Agro-Industries & Light Industries)  
United Nations Economic and social  
Commission for Asia and the  
Pacific (ESCAP),  
Salasantitham,  
Bangkok, Thailand.

ANNEX II

OUTLINE OF TOUR PROGRAMME OF UNIDO DELEGATES

Bombay

24.1.76 Arrival

25.1.76 Get-together and Introduction

Visits of Delegates in 5 Groups:

- Group I : M/s. Godrej Soaps Pvt. Ltd., Vikhroli.  
M/s. DeSmet (India) Pvt. Ltd., Thana.
- Group II : Tata Oil Mills Co. Ltd., Sewri.  
Pennwalt India Ltd., Sewri.  
Indian Vegetable Products Ltd.,  
Connaught Circle Road.
- Group III : Servotech Engineers Pvt. Ltd., Dahisar.  
Vegetable Vitamins & Food Products (P) Ltd.,  
Sion.  
Ahmed Omerbhoy, Two Tanks.
- Group IV : Jayant Oil Mills, Mazgaon.  
Jai Hind Oil Mills, Bombay-9.
- Group V : Hindustan Lever Ltd., Sewri.  
Liberty Oil Mills, Ghatkopar.

26.1.76 Conference with Industrialists and Technologists  
at Taj Mahal Hotel.  
Visit to Elephanta Caves.

27.1.76 Group I : Berar Oil Industries, Akola, Maharashtra.  
(By Train) Hanuman Cottonseed Products (P) Ltd.,  
Khamgao, Maharashtra.

Group II : Hindustan Lever Research Centre,  
Chakala, Andheri (East).  
University Department of Chemical  
Technology, Matunga.

Hyderabad

28.1.76 Rajendra Oil Mills, Azamabad.  
Tungabhadra Industries, Walker Town, Secunderabad.  
Jayant Oil Mills, Uppal.

29.1.76 Krishna Engineering Workshop, Azamabad.  
Kedia Vanaspati & Binjisar Solvent Extraction  
Unit for rice bran.  
Visit to Zoo and Salar Jung Museum.  
Regional Research Laboratory, Tamaka.  
Conference with Industrialists & Technologists  
and Researchers at Regional Research Laboratory.

Bangalore

30.1.76 Government Soap Factory.

Mysore:

31.1.76 Government Sandalwood Oil Factory.  
Central Food Technological Research Institute.  
Conference with Food Technologists.  
Visit to Brindavan Gardens.  
Back to Bangalore and on to Calcutta after  
overnight stay at Madras.

Calcutta

1.2.76 Rasoi Vanaspati Factory.  
Conference with East India Oil Millers  
Association and Oil Technologists.

2.2.76 Hindustan Lever Ltd.  
Dulichand Omraoall Oil Mill.  
National Test House, Alipore.  
Meeting with W.Bengal Minister for Science & Technology.  
Conference with Machinery Manufacturers' & Technologists.

3.2.76 The APV Engineering Co.Ltd., Dum Dum.

Kanpur

3.2.76 Conference with U.P.Oil Millers' Association.

4.2.76 Ganesh Flour Mills.  
S.P. Products (P) Ltd.  
S.P. Engineering Works.  
Harcourt Butler Technolical Research Institute.  
Conference at HBTI with Industrialists, Technologists,  
Teachers and Researchers.  
Visit to J.K. Temples.

Agra

5.2.76 C. R. Oil Mills  
B. P. Oil Mills  
Wheat Flour Mills  
Visit to Taj Mahal and Agra Fort.

Delhi

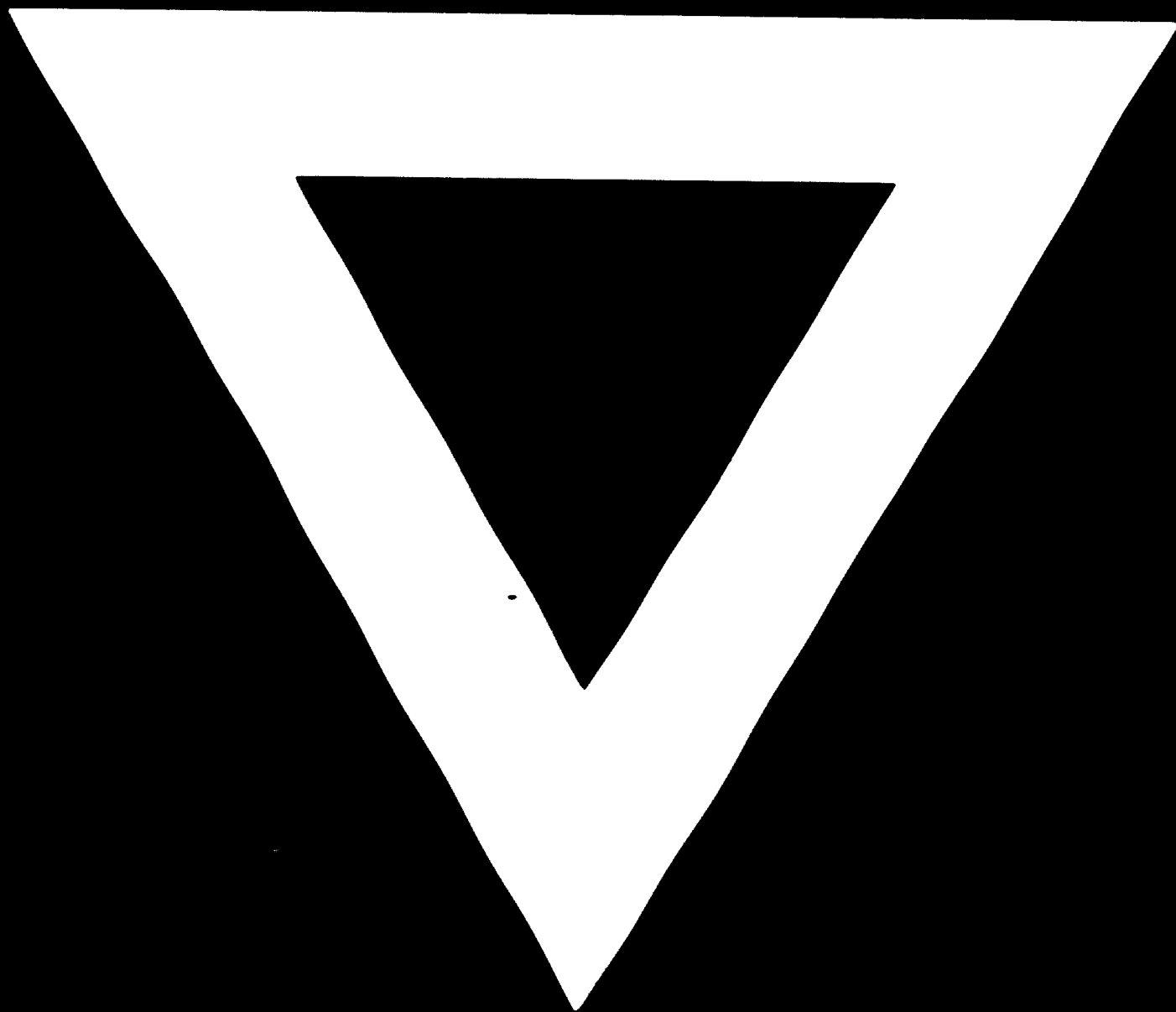
6.2.76 DCM Chemical Works.  
Indian Standards Institution.  
Sri Ram Institute for Industrial Research.  
United Oil Mill Machinery & Spares (P)Ltd., Ballabhgarh.

7.2.76 Participation in 31st Annual Convention of OTAI  
and Technical Sessions.  
Discussion with Govt. officials of Indian Council  
of Agricultural Research at Krishi Bhavan.  
Cultural Programme.

8.2.76 Participation in OTAI Symposium and Exhibition.  
Conference with OTAI delegates.

9.2.76 Visit to Indian Agricultural Research Institute, Pusa.  
Visit to Cultural and Historical places in Delhi.

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